# Unit 3 - Week 1



## Assignment 1

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-09-30, 23:59 IST.

1) 1 point

Select the correct option about design constraints.
I. A designer has no control on external constraints.
II. A designer has some control on internal constraints.

(a) Only statement – I is true
(b) Only statement-II is true
(c) Both the statements are true
(d) Both the statements are false

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

2) 1 point

Select the correct option about batch vs continuous operations.
I. Batch operations are preferred for low-volume, high-value products.
II. Chances of variability in product quality are higher in continuous operations.

(a) Only statement – I is true
(b) Only statement-II is true
(c) Both the statements are true
(d) Both the statements are false

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a)

3) 1 point

Match the column:

| Column1 | Column 2 |
|---|---|
| a. Gate valve | 1  |
| b. Ball valve | 2  |
| c. Globe valve | 3  |
| d. Butterfly valve | 4  |

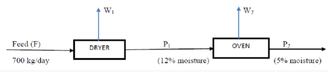
(a) a-1, b-3, c-2, d-4
(b) a-2, b-3, c-4, d-1
(c) a-4, b-3, c-2, d-1
(d) a-1, b-2, c-3, d-4

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a)

4) 1 point

A dryer (see the figure below) has a capacity to handle 700 kg of wet solids on a daily basis. Feed with a moisture content of 40% is fed to the dryer and the product from this dryer contains 12% moisture. This product is then fed to an Oven which further reduces the moisture content to 5%. The total amount of water which is removed by the combination of Dryer and Oven is equal to _____ kg.




No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 250,265

5) 1 point

Benzene has a Permissible Exposure Limit (PEL) of 1 ppm (volume/volume basis). Liquid Benzene is evaporating at a rate of 5 ml/min at a temperature of 25$^0$C and a pressure of 14 psia. Assuming Benzene vapours to behave as an ideal gas, find the ventilation rate of air (in m$^3$/min) so that the Benzene concentration lies below the PEL value. Given: Density of Benzene at 25$^0$C = 873.7 kg/m$^3$ and Molecular weight of Benzene = 78.1 g/mol.

The required ventilation rate of air (m$^3$/min) is _____.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1420,1450

6) 1 point

Estimate the specific enthalpy of ethyl alcohol at 1 bar and 200°C, taking the datum temperature as 0°C. The boiling point of ethyl alcohol at 1 bar = 78.4°C, and the latent heat of vaporisation = 9.22 kcal/mol.

The variation of specific heat (cal/mol °C) with temperature (T °C) at 1 bar for ethyl alcohol in liquid and vapour phases are given below.

$$C_{p,liquid} = 24.65 + 0.133T \text{ cal/mol}^\circ\text{C}$$

$$C_{p,gas} = 14.66 + 3.758\times10^{-2}T - 2.091\times10^{-5}T^2 + 4.740\times10^{-9}T^3 \text{ cal/mol}^\circ\text{C}$$

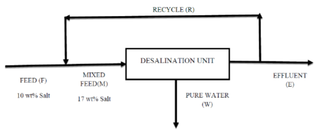
The specific enthalpy of ethyl alcohol at 1 bar and 200°C is _____ cal/mol.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 13900,14000

7) 1 point

Consider the Flow Diagram for a Desalination unit as shown below. Pure water (stream W) is to be obtained from a Fresh Feed (stream F) containing 10% salt by weight.

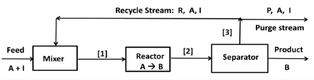



The overall recovery of Pure Water (through stream W) is 0.6 kg/kg Fresh Feed. For a 100 kg/hr of Mixed Feed (stream M) entering into the desalination unit, the amount (in kg/hr) that is Recycled is _____.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 42,52

8) 1 point

Consider the Block Flow Diagram shown below. Fresh feed of A containing 0.5% of inerts (I) by volume enters the mixer where it gets mixed with the recycle stream before entering the reactor. The reaction A → B takes place in the reactor and 60% conversion of A per pass is obtained. The product B is completely removed from the separator. Assume that all streams behave like ideal gases and the process is at steady state. If the concentration of inerts going into the reactor must be held at 2% by volume, the number of moles need to be purged per mole of combined feed (outlet stream of mixer, point [1] in the figure) to the reactor is _____.
(Write your answer upto 3 places after decimal)




No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.055,0.075

9) 1 point

Match the column

| Column 1 | Column 2 |
|---|---|
| a. Electrical signal | 1  |
| b. Pneumatic signals | 2  |
| c. Hydraulic signals | 3  |
| d. Data link | 4  |

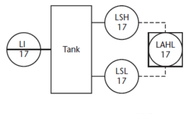
(a) a-2, b-3, c-4, d-1
(b) a-1, b-2, c-3, d-4
(c) a-1, b-4, c-3, d-2
(d) a-1, b-3, c-4, d-2

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
c)

10) 1 point

Select the correct option about the following P&ID.




I. The tank has a direct reading level indicator LI17
II. The tank has a high-level detector LSH17, and a low-level detector LSL17
III. The alarm will be activated if the fluid level is above the set high level or below the low set level

(a) All the statements are true
(b) Only statement-I and statement-II are true
(c) Only statement-II and statement-III are true
(d) Only statement-I and statement-III are true

a)
b)
c)
d)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a)